The global burden of lung disease
Living to 100 in a California town
The gluten-free fad
The statin controversy
ON THE COVER: The smoggy skyline of Beijing, China. A lone tree in the foreground in the shape of human lungs symbolizes the negative effect of air pollution on the public. Read more about how this and other factors can be addressed through a public health approach on page 10.
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Colleagues,

The Institute of Medicine defines public health as “what we, as a society, do collectively to assure the conditions for people to be healthy.” Epidemiology, as the science of public health, then has a particular responsibility to provide data that can guide the improvement of those conditions.

The summer issue of 2x2 synthesizes new research that is concerned with the creation of these conditions. We highlight articles that look at the relationship between lung disease and economic development, how place influences longevity, whether a gluten-free diet is really better for everybody, how new statin guidelines might change treatment for heart disease, and the inextricable link between urban planning and promoting health.

These stories illustrate how epidemiological research examines the conditions that can improve population health on the broadest scale. I hope you find them interesting and informative.

Warm regards,

Sandro

They have been called “suicide outbreaks,” “suicide epidemics,” or “copycat suicides”—when multiple suicides occur in a community in a short period of time, usually among teenagers and young adults. Suicide clusters are somewhat of a mystery: why does a suicide lead to an “outbreak” of many more in some communities but not in others?

To help answer that question, a group of researchers at Columbia University, led by Dr. Madelyn Gould, a professor of epidemiology in psychiatry, examined the influence of media coverage in the initiation of suicide clusters, in a study published in Lancet Psychiatry last month. Although research has shown that press reports are associated with suicide spikes nationally, no study had yet examined how they might influence suicide clusters.

Dr. Gould and her colleagues examined the period between 1988-1996 looking at news reporting in various communities around the country in the aftermath of the first suicide of a cluster. They compared this to coverage in communities that saw just one suicide. They found that there were significantly more news stories in cluster communities than in isolated suicide communities, suggesting an association between reporting on suicides and suicide clusters. Newspapers in the cluster communities gave more prominent and detailed coverage of suicidal individuals, such as front-page placement, photography, headlines containing the word “suicide,” specification of the method used, and a more detailed description of the person and how he or she committed the act.

The researchers only observed the association in the coverage that focused on a suicidal individual—as opposed to stories that covered suicide more generally. This “supports the theory that the media effect operates through the mechanism of identification with a model.... [T]he models with the most effect are those who are either similar to the reader (i.e., another teenager) or revered by him or her (e.g., a celebrity),” the authors write.

The authors controlled the study so that nothing about the suicides they examined would have led to varying coverage in the comparison groups—such as how graphic or public a suicide was.

Although the study does not prove causality, the authors suggest theories for why media coverage could influence suicides. Repeated coverage may normalize suicide in the eyes of young, vulnerable people, according to one theory, or it may “prime” latent thoughts in already suicidal youth, according to another theory.

Media guidelines on how to cover suicide, which have been published by the World Health Organization, among other sources, can be helpful.

“In light of the extensive use of social media by teens, we hope our current findings will stimulate research on social media’s impact on suicidal behavior. We also would recommend that our suggestions for responsible reporting about suicidal individuals be applied by all who generate suicide-related stories via social media, which would include teens, as well as media professionals,” the authors say.

n states where they experience more systematic disadvantage than whites, blacks have worse cardiovascular health than they do in states where opportunity is more evenly distributed, according to a study published in the journal *Social Science & Medicine*.

While past research has looked at the effects of self-reported experiences of discrimination on health at an individual level, this study is one of the first to examine how unfair treatment at an institutional level contributes to health, according to the authors, Dr. Katherine Keyes, an assistant professor of epidemiology, Dr. Mark Hatzenbuehler, assistant professor of sociomedical sciences, and Dr. Alicia Lukachko, a postdoctoral alumna of the Psychiatric Epidemiology Training Program, all from Columbia University's Mailman School of Public Health.

To determine what the researchers call “structural racism,” which they define as “the systematic exclusion of blacks from resources and mobility in society,” they looked at the percentage of blacks compared to the percentage of non-Hispanic whites in each of the 50 U.S. states on several measures: holding a college degree, employment, incarceration, and participation in the state’s political system.

Blacks were more likely to report having had a heart attack in the past year in states where there was greater inequality in the number of blacks versus whites employed, well educated, and politically represented. In states where the gulf between blacks and whites in prison was larger, they were also more likely to have had a heart attack in the past year. Across the United States, blacks are jailed or put in prison from two to 14 times more frequently than whites.

Interestingly, the results indicate that structural race inequality plays a larger role than socioeconomic status in determining health outcomes. In states where on average blacks occupy a higher socioeconomic status, but the gap in opportunity between blacks and whites is greater, health problems are worse than in states where blacks occupy a lower socioeconomic status but there is less inequality.

“While inequality does track with socioeconomics of U.S. states, there is considerable variation; for example, states like Maine and New York have higher rates of inequality than would be expected given their economic profiles,” says Dr. Keyes.

As for whites, they reported better cardiovascular health in states where there was more structural racism.

“These results raise the provocative possibility that structural racism may not only harm the targets of stigma but also benefit those who wield the power to enact stigma and discrimination,” write the authors of the study.

Structural racism did not appear to influence health when it came to job status. Black Americans in states with greater parity in terms of the relative percentage of blacks and whites in high status executive or managerial positions actually were at higher odds of a heart attack than those in states with a greater disparity.

This is not the first time researchers have observed this. Epidemiologist Dr. Sherman James found that blacks in high status positions cope with structural racism like the pressure to assimilate and defy negative racial stereotypes by putting forth extraordinary levels of effort, often at the expense of their health. He called this phenomenon John Henryism, invoking an American folk figure who worked himself to death while he was successfully competing against a steam powered machine.

“People with high levels of [John Henryism] and inadequate resources have a much higher prevalence of health disorders… because they drive themselves toward reaching specific goals at the expense of their health, often without realizing they are doing so,” says research that emerged from a 2006 symposium on the subject.

“While many recognize that
disparities in civil engagement, incarceration, and employment are problematic on a social level, this is among the first of studies to show an association between these structural forms of inequality and health,” says Dr. Keyes. “Our results suggest that improving social conditions at a very macro level, which is logistically difficult but has been done many times before, may have positive health benefits for those Americans with the highest levels of many chronic adverse health events.”

A stay in hospital intensive care could put patients at unique risk of having psychiatric troubles such as depression or post-traumatic stress disorder, according to a new study published in the Journal of the American Medical Association from researchers at Columbia University, University of Pittsburgh, Ohio State University, and Denmark’s Aarhus University Hospital.

“A large percentage of the critically ill population had no history of diagnoses such as depression or treatment for depression yet had substantially increased rates of this diagnosis and prescriptions for psychoactive medications in the year after the critical illness,” the paper says. “However, the largest increase in risk occurred in the first few months after the critical illness, suggesting that the risk may be transient.”

“In the community of providers of critical care, there’s an increasing awareness that this is a likely issue for people after intensive care,” says Dr. Hannah Wunsch, an assistant professor of epidemiology and anesthesiology at Columbia’s Mailman School of Public Health. However, there had not been good population level research on this issue before, she says.

The investigators analyzed data from Denmark’s National Registry of Patients, one of the most comprehensive repositories of patient information because all of that country’s hospitals are included. They looked at 24,179 intensive care patients who had been admitted to a hospital between 2006-2008 with an “unanticipated critical illness” and had received mechanical ventilation. They compared this group of patients to two other groups: general population controls and a population of patients who stayed in a hospital but were not critically ill.

The intensive care cohort was at a 20-fold increased likelihood of receiving a new psychiatric diagnosis or psychoactive medication compared to the general population in the first few months after critical illness, and at a 2-3 fold increased risk compared with the non-critical care hospital population. However, the absolute risk of receiving a new psychiatric diagnosis in the first three months after being discharged was small.

The results are consistent with smaller cohort studies, some of which were done in the U.S., according to Dr. Wunsch. The instances of post-intensive care psychiatric diagnosis could even be higher in the U.S. because overall rates of diagnoses of psychiatric illnesses are higher here than in Western European countries.

There are no standards for screening for depression, anxiety, and PTSD when discharging patients, according to Dr. Wunsch, who practices in the surgical intensive care unit at Columbia University Medical Center.

“We certainly see patients who by the end of their stay in intensive care are severely depressed,” she says. She has also met patients months or years after their stay in an ICU who say they have PTSD from the experience.

As the rate of overdosing on prescription opioids like Oxycontin and Vicodin has risen dramatically across the U.S. since the early 1990s, states have tried to reign in over-prescription of these popular painkillers. A new study suggests that some states may have made major headway, while others seem to be having more difficulty.

Published in the March/April issue of Public Health Reports, the study examined the influence of prescription drug monitoring programs (PDMPs), which exist in some form in all 50 states, on the rates of opioid analgesics dispensed over the years 1999-2008. In such programs, an agency houses an electronic database tracking controlled substances dispensed throughout the state. Authorized individuals like doctors and pharmacists can consult the database to monitor whether patients are “doctor shopping”—getting painkillers and other drugs from multiple doctors. Law enforcement can also seek access to track suspicious prescribing activity by medical providers.

Dr. Guohua Li, Finster Professor of Anesthesiology and Epidemiology; Dr. Charles Dimaggio, associate professor of epidemiology; Dr. Hannah Wunsch, assistant professor of epidemiology and anesthesiology; and doctoral trainee Ms. Joanne Brady, of Columbia’s Mailman School of Public Health and College of Physicians & Surgeons, examined quarterly data from the U.S. Drug Enforcement Administration.

The annual number of prescriptions for the painkillers fentanyl, hydrocodone, hydromorphone, meperidine, methadone, morphine, and oxycodone nearly tripled between 1991 to 2010, from about 76 million to nearly 210 million, according to the National Institute on Drug Abuse.

When averaged together, state prescription drug monitoring programs were associated with only a small decline in morphine milligram equivalents of opioids. However, when the research team looked on a state-by-state basis, they found big differences among states: nine states reported significantly fewer opioid prescriptions after launching their drug monitoring programs, 14 reported no change, and eight states reported significant increases.

Over the 10-year period, Colorado had the greatest decrease in opioids dispensed associated with its prescription drug monitoring program, followed by Texas and Wyoming. Connecticut had the largest increase.

PDMPs that are overseen by state health departments appeared to be more effective than those administered by other government agencies, such as a state bureau of narcotics or a board of pharmacy, according to the authors. “It indicates a public health approach is more effective than alternatives, such as the law enforcement and criminal justice approaches,” says Dr. Li.

“While data through 2008 show state prescription drug monitoring programs have greatly expanded and rates of opioids dispensed are stabilizing, there exists considerable room to improve the overall effectiveness of state PDMPs, such as increasing interstate data sharing and making prescription drug-dispensing information accessible by healthcare providers in real time,” says Ms. Brady.
n March of last year, at the 20th Conference on Retroviruses and Opportunistic Infections (CROI) in Atlanta a group of researchers announced that a child in Mississippi who underwent viral control post-antiretroviral therapy (ART) had been cured of HIV. The story took the media by storm, with headlines in the New York Times, CNN, and PBS’s News Hour, among other places. But some experts were skeptical and asked whether the results had been released prematurely.

Was the Mississippi baby really cured of HIV? In order to better understand the case, it is important to define what a cure entails in the field of HIV research. An eradication cure involves completely eliminating HIV-infected cells from the body so that the virus is no longer present. The only example of what experts consider an eradication cure is “the Berlin patient,” reported in 2009. The patient, Timothy Brown, received a stem cell transplant from a donor who had a genetic mutation that protects the immune system from the HIV virus. Since then, Brown has shown no signs of HIV and been off treatment for six years.

The Mississippi baby, on the other hand, is an example of a “functional cure,” which involves treating individuals so that the virus decreases to such levels that it does not cause disease and can be controlled without continued antiretroviral treatment. The Mississippi baby’s functional cure came about almost by accident. The infant was born to a mother who was not diagnosed before birth—the optimal time to prevent HIV transmission from a mother to child. As a result, her baby was started on a more aggressive therapeutic regimen at 30 hours after being born rather than a more typical regimen. After starting treatment the child’s viral load came down even though the mother missed scheduled appointments for her child at 18 months. When she came in five months later, she reported that the child had not been on treatment since the last visit. Yet tests showed the child had no detectible viral load.

A year later at the 21st CROI, researchers reported that the Mississippi baby had been off ART for almost two years with no rebound of HIV. The researchers also reported on a second infected child who was started on antiretroviral treatment at four hours of age and had no detectable replication of HIV, though the child remained on treatment.

A recent review that I published with Dr. Louise Kuhn, professor of epidemiology in the Gertrude Sergievsky Center at Columbia, highlights important issues in the treatment of HIV-infected infants raised by the Mississippi baby. Though starting treatment at birth may bring the possibility of a functional cure, there are diagnostic challenges. Early initiation depends on early diagnosis of HIV-infected infants. HIV testing will have to occur not only at birth to detect infections that occur in utero but again later to detect infections that occur during delivery and in the early postnatal period. There also are limited safe and effective treatment formulations available for newborns.

Though the case of the Mississippi baby has brought optimism around the possibility of a functional cure in HIV-infected infants, more research is needed. In the meantime, aiming to provide treatment for HIV-infected children who are not receiving it should continue, and prevention of mother to child transmission should remain a priority.

Universities should embrace implementation science

The nature of the relationship between academic institutions and the “real” world has long been debated, with some arguing that the university does not do enough work to improve society.

Drawing on the work they have done to implement HIV treatment and prevention programs in resource-limited settings at ICAP, Dr. Wafaa El-Sadr, university professor of medicine and epidemiology at Columbia’s Mailman School of Public Health, Dr. Jessica Justman, associate professor of medicine and epidemiology at Columbia, and Ms. Neena M. Philip, a program coordinator, argue in the New England Journal of Medicine that academic institutions should expand their core mission to include the pursuit of a wider range of research. In particular, the university should embrace “implementation science,” which focuses on how new discoveries are translated into treatments and programs and how these treatments and programs are brought to scale.

“Academic institutions have an opportunity to embrace societal challenges more fully by placing value not only on discovering the ‘what’ but also on elucidating the ‘how’ and bringing to action discoveries with broad benefits,” the authors say.


Park features associated with body mass index

The size and cleanliness of a neighborhood park has a strong association to the body mass index (BMI) of the neighborhood’s residents, according to a study by Dr. Andrew Rundle, associate professor of epidemiology, Dr. Gina Lovasi, assistant professor of epidemiology, both at Columbia’s Mailman School of Public Health, and colleagues. Looking at New York City, the researchers determined size by measuring the proportion of a zip code that was park space and measured cleanliness by looking at a “park cleanliness index,” determined by the city’s Department of Parks and Recreation.

After adjusting for other characteristics like homicides and walkability, they found that residents with lower BMI were more likely to live in neighborhoods with larger and cleaner parks than residents with high BMI.

“As urban planners and public health officials consider ways to enhance and design neighborhoods, efforts should be given to creating safe and clean physical activity environments that encourage use among nearby residents,” the authors say.


Genetic testing for epilepsy brings hope and challenge

In the past 20 years, there has been a dramatic increase in the discovery of genes that play a role in epileptic disorders. This has paved the way for increased clinical genetic testing of people who have epilepsy, in order to clarify the diagnosis, inform treatment, and improve prognosis. Although the availability of genetic testing has distinct advantages, it also raises complex issues, such as how to educate physicians about when and how to test and how to ensure affected individuals and their families can make informed choices about testing and receive support after receiving the results, says Dr. Ruth Ottman, professor of epidemiology at Columbia’s Gertrude H. Sergievsky Center, and colleagues, in Nature Reviews Neurology.

Moreover, the genes do not always tell the full story. Not all epilepsies can be detected with genetic tests, and conversely, sometimes people have genetic variants associated with epilepsies while not actually showing signs of the disorder. On the other hand, the advantages of genetic testing include hastening and clarifying the diagnosis, assisting with reproductive decisions, and helping people to plan for the future.

“Genetic testing has the potential to revolutionize care for epilepsy, but we need to address the challenges involved to ensure services are delivered in the most effective, sensitive, and equitable manner possible,” the researchers say.

The global burden of lung disease

Smoking, pollution major factors that could be controlled through a public health approach

BY ELAINE MEYER
These experiences represent the global scope of lung diseases, which are a heavy burden in low, middle, and high-income countries alike. They are among the leading causes of death in the world, according to a recently released report by the Forum of International Respiratory Societies. Yet because they often manifest in initially less dramatic symptoms like a cough or headache, and because they are associated with cigarettes, lung diseases often are ignored or written off as a smoker’s problem.

“Some of these things seem like background noise. I think that’s part of the problem,” says Dr. Neil Schluger, a professor of medicine, epidemiology, and environmental health sciences and chief of the pulmonary, allergy and critical care medicine division at Columbia University.

According to Dr. R. Graham Barr, a professor of medicine and epidemiology at Columbia, “The bottom line is that the amount we spend on research diagnosis and treatment in lung disease is miniscule compared to cardiovascular disease or nonsmoking related cancer.”

Diseases of the lung have existed since Greek and Roman times, but they have increased dramatically with industrialization, the development and marketing of cigarettes, and the drop in deaths from other diseases.

A delicate and complex system, the lungs are the only internal organs that are constantly exposed to the environment. When people regularly breathe in toxins, their lungs over time can experience inflammation, scarring, and infection. Because the damage accumulates gradually, people do not always make the connection between hazardous air exposures and diseases like lung cancer, chronic obstructive pulmonary illness or COPD, acute respiratory tract infection, and tuberculosis—four of the leading causes of death in the world.

Since becoming chief scientific officer of the World Lung Foundation, Dr. Schluger has been working to draw attention to lung diseases and the central role that is played by the air we breathe. “Although molecularly lung diseases are different from each other, they are all exacerbated by pollution and tobacco,” he says.

In March, he and Dr. Ram Koppaka, a senior advisor at the Centers for Disease Control and Prevention, wrote for this edition of The Lancet that the global burden of lung disease is being undercounted, but the picture is changing with growing attention to the issue.

In rural Kentucky, a middle-aged woman who used to smoke visits her doctor complaining of shortness of breath. In Beijing a young man walks to work in a haze of smog with a splitting headache. In Nairobi, Kenya, a young woman hunches over a stove, breathing in toxic fumes and coughing as she cooks her family’s dinner over charcoal.

This situation is not unique. In Beijing, China, increased dramatically with industrialization, the development and marketing of cigarettes, and the drop in deaths from other diseases.
Control and Prevention published a think piece in the *Annals of the American Thoracic Society*, articulating the problem: “The lung diseases that account for the greatest global morbidity and mortality are preventable to a very significant degree.”

“A new approach is required that goes beyond simply developing new treatments for each of the major respiratory disorders.”

**Outdoor air pollution**

Last October what became dubbed as the “Airpocalypse” hit Harbin, China, a city of 10 million in the northeastern part of the country. A thick, grey cloud of pollution rendered visibility so low that people walking side by side reported they could not see each other. Schools closed, highways shut down, and authorities urged people to stay home. The air quality score index went above 500—which is the highest possible number on that scale and 20 times the level of particulate matter considered safe by the World Health Organization (WHO).

Catastrophic levels of air pollution and other related consequences, such as heavy traffic, contaminated farmland, and ailments among factory workers, spotlight the Chinese government’s failure to check the pace of industrialization and development. Where that pace once evoked fear on the part of economic competitors like the U.S., China is increasingly becoming an exemplar of the problems wrought by unrestrained development seen in many middle-income countries, like India, Egypt, and Pakistan. “There’s such a rush to develop economically that government regulations on things like air pollution or sale of cigarettes sometimes become secondary,” says Dr. Schluger.

According to WHO, one in eight of total global deaths in 2012—7 million people—were linked to air pollution. With the global trend toward urbanization, the problem will likely get worse.

In their paper, Drs. Schluger and Koppaka say that “Governments must be held accountable...for protecting the lives of their citizens at least as much as they protect the commercial interests of large industries.” They cite ways that high-income countries have reduced pollution at its source, such as mandating lead-free gasoline, encouraging fuel-efficient

An estimated 4.3 million people die each year as a result of exposure to household air pollution, a big part of which comes from rudimentary cook stoves that burn dirty fuels like coal, animal dung, straw, and agricultural waste, according to WHO.
According to WHO, one in eight of total global deaths in 2012—7 million people—were linked to air pollution.
Projected global increase in cancer-related costs per year

These two stacked bar graphs depict the projected increase in cancer-related costs in 2030 compared with 2010 for the top 10 most prevalent cancers. The graph on the left shows the absolute increase in cancer-related costs along the x-axis. The graph on the right shows the relative, or percent, increase in cancer-related costs along the x-axis. Along the y-axis for both graphs is a list of the top 10 most prevalent cancers, ordered from top to bottom in ascending order according to the cancer associated with the lowest projected absolute annual increase in related costs. The largest absolute increase in cancer-related costs is projected to occur with lung cancer, with a large proportion of the increase occurring due to medical costs and income losses.


Originally published on the GRAPH website, at cugraph.org
leader, with a hefty increase on cigarette taxes and bans on smoking at indoor and outdoor public spaces. Since the ban was enacted in 2003, the percent of active smokers has decreased in New York City from 21 to 14, and the city now has the lowest rate of lung cancer deaths in the New York state, according to the American Cancer Society of New York and New Jersey.

“Mayor Bloomberg saved more lives from lung disease than any physician in New York or any hospital because of what he did to decrease tobacco use in the city,” says Dr. Schluger. “Individuals can say, ‘I’m not going to smoke,’ but they need help from the government,” he adds.

That help is more forthcoming in some countries than others. In 2013, the WHO ratified the Framework Convention on Tobacco Control, which sets a universal standard for regulating tobacco production, sales, advertising, distribution, and taxes. “Almost every country in the world has signed it, almost no country has adopted all of its measures,” says Dr. Schluger.

Promoting global public health

Despite the challenges implementing the tobacco treaty, Drs. Schluger and Koppaka urge WHO to pass a similar treaty to address air pollution and occupational exposure.

“We do not underestimate the difficulty in reducing the impact of the important drivers of lung disease in the world,” they say. “These drivers arise to a great degree because of poverty (e.g., due to a lack of access to clean burning fuels and efficient stoves for cooking) because of a lack of government oversight and regulation (regarding the sale of tobacco products or worker safety), or a combination of both.”

The centrality of public health interventions cannot be underestimated. Dr. Schluger says: “When I think of the global burden of lung disease, these public health and population approaches could be so much more effective than waiting for people to get sick and treating them.”

Tuberculosis requires more attention, investment

Drug companies, governments, and other sources under-invest in tuberculosis compared to other global diseases, especially given the emerging threat of new strains of multi-drug resistant tuberculosis, says Dr. Neil Schluger in the Financial Times: “The biggest challenge is for people to realize how much TB is out there. The rate is going down 2 percent a year but that is too slow for eradication to happen for decades to come.”

Read more

» Big pharma balks at investment in TB
  on.ft.com/1dOlsho

» Stubborn new TB strain threatens to reverse progress
  on.ft.com/ObAA0i

» TB, disease of the poor, now threatens rich
  on.ft.com/1dDsW81

“The [U.S.] president’s budget proposal, with stunning short-sightedness, calls for a $45 million cut for USAID’s TB program,” writes Dr. Gerald Friedland, adjunct professor of epidemiology at Columbia’s Mailman School of Public Health. Read more in the Hill. [bit.ly/1fEOsNA]
Place and health: into the blue zone

Lessons for living to 100 from Loma Linda, California

BY PATCHES MAGARRO
COMMUNICATION IN EPIDEMIOLOGY & HEALTH FELLOW

A view of Loma Linda and the Loma Linda University Medical Center.

the2x2project.org

2x2.ph/ORUNaZ

IMAGE: COSMIN COSMA
Imagine, at the age of 100, mowing the lawn and walking miles per day with neighbors in their nineties. If it seems impossible to live long enough to reach the triple digits, let alone arrive at the century mark in good health, simply consider life in Loma Linda. Loma Linda, California, is a small city about 60 miles east of Los Angeles. It is also home to a relatively large number of centenarians and is therefore the only recognized “blue zone” in the United States, where the average individual life span is much greater than other American cities.

Outside of the U.S., there are other blue zones. Nicoya, Costa Rica, has exceptionally hard water, rich in calcium and magnesium. The radon-enriched thermal baths of Icaria, Greece, are credited with contributing to longevity; residents of the island are four times more likely to reach the age of 90 than Americans and at avoiding chronic disease as they age. However, the remarkable longevity of Loma Linda’s residents is uniquely inspiring because their lifestyle can be adopted almost anywhere. While genetics are a factor, up to 80 percent of longevity depends on decisions people make about their lifestyles, which could translate into enjoying good health until nearly 90 years old.

About half of Loma Linda’s 23,000 residents are practicing Seventh Day Adventists, which sets the city apart from otherwise analogous places in the U.S. The Adventists eschew smoking and encourage staying lean, engaging in regular physical activity, eating nuts, and sticking to a vegetarian diet. And in addition to a focus on God, they promote strong social and family ties and volunteerism.

A Matter Of Choice?

Adopting the Adventist lifestyle could add up to 10 years to a person’s lifespan. A paper published in 2001 in the Archives of Internal Medicine explored this very possibility. Due to their lifestyle choices, Adventists provide an opportunity to study certain behaviors in the absence of other confounding factors. The authors of the paper examined data from a large sample of over 34,000 Adventists over the course of 12 years, and found that California Adventists’ life expectancies exceed that of any other natural population.

But there is good news for those who are not planning to convert to the Adventist religion. “It seems likely that the effects of these particular variables on life expectancy can be applied to Adventist and non-Adventist populations. There is no reason to suspect that Adventists are biologically different in their responses to environmental exposures.”

Dan Buettner, author of The Blue Zones: Lessons for Living Longer From the People Who’ve Lived the Longest, has studied Loma Linda and other longevity hot spots across the globe. One key recommendation he makes for anyone looking to make healthier choices comes from another blue zone, Okinanwa, Japan. The people of Okinawa form personal networks called moais that provide support throughout their lives, and he stresses how important such groups are for making successful changes. “We know that social behaviors are as contagious as catching a cold...we’re setting up this network that has the right contagion flowing through it,” Mr. Buettner says. The “right contagion” flowing through moais includes walks and plant-based pot luck dinners.
The Picture Of Health At 100

Dr. Ellsworth Wareham of Loma Linda is a walking—and driving!—billboard for an Adventist lifestyle program. He will turn 100 this October. Dr. Wareham is impressive because of his age, but even more so because of his vitality. When speaking by telephone, it is difficult to picture a centenarian on the other end of the line: his voice is clear and steady, his mind sharp, and his conversation full of details of a life that sounds more like that of a person in their 60s or 70s than of a man planning his 100th birthday celebration. He claims to have no aches or pains and hasn’t had a cold or flu in years, maybe decades.

At the age of 95, Dr. Wareham retired from a very long career as a heart surgeon. When asked what he had been up to recently, he elaborated on his activities the prior day. He drove alone about 70 miles each way to attend a bris for a friend’s son. It was his first time at such an occasion. Even after so many years, he is still having new experiences. Most days are less eventful. He resides with his wife of 64 years, Barbara. He says he is leisurely about starting his day with breakfast around 9 or 10 o’clock, which always includes a banana and one other fruit, nuts, and a whole grain cereal such as Grape Nuts or Shredded Wheat. He then will do chores around the house and care for his yard. He still mows his own lawn. He is able to go up and down a flight of stairs with ease, and finds that he ends up climbing them several times a day, which adds to his daily activity. He is an avid reader, but “Never fiction. I’m too lazy for fiction.”

He eats two meals per day, and has the second in the late afternoon. Mrs. Wareham prepares vegetables and legumes. “Occasionally she’ll make one of those meat analogs—you know what I mean, fake meat,” he says. As a vegan who never really cared for dairy products, he admits, “If I digress…I may have a piece of salmon.”

Maybe there will be salmon on the menu when his five children, eight grandchildren and three great-grandchildren come to celebrate his centennial this year. If more Americans put a plant-based diet and active lifestyle on their own menu, Loma Linda might not be the only blue zone in the United States, a place where centenarians still mow their lawns.
Epidemiology Matters is a digital space intended to be a forum for an ongoing epidemiology conversation, providing up-to-date resources useful to trainees and practicing epidemiologists alike. The site is anchored around the book, *Epidemiology matters: a new introduction to methodological foundations*, with supplementary materials.
Does your brain really do better off grain?

Experts question the science behind gluten-free diets

BY KAITLIN UGOLIK

the2x2project.org
2x2.ph/1clvQW5
Americans are increasingly adopting a gluten-free diet, spurred by claims that avoiding this protein, found in wheat and other grains, might cure various ailments or even prevent diseases such as Alzheimer’s and dementia. Eliminating gluten is typically recommended for people with celiac disease, a condition in which the small intestine’s ability to absorb nutrients is inhibited by the gluten protein. Incidences of celiac disease are rising in the U.S.—a 2012 study from the Mayo Clinic found that the number of U.S. adults with the disease has increased four-fold over the last 50 years, with about 1 percent of adults currently affected.

However, most Americans on a gluten-free diet do not have celiac disease. In a 2013 survey conducted by the Food Marketing Institute, only 2 percent of shopper respondents said they bought gluten-free foods because they had a celiac sensitivity; 59 percent said they simply believed gluten-free foods to be healthier.

The reasons for the increase are not entirely understood, but one unintended consequence is clear to anyone who has walked down the aisles of a grocery store recently, where there is a “gluten-free” label on everything from boxes of crackers to milk cartons. The idea that gluten-free is healthy has spread rapidly, championed by celebrity doctors including Dr. Mehmet Oz and Dr. David Perlmutter, a Florida physician and author of the 2013 book Grain Brain: The Surprising Truth About Wheat, Carbs and Sugar — Your Brain’s Silent Killers.

Gluten-free may not be healthy for those who don’t have celiac disease

Though increasingly trendy, a gluten-free diet can actually be harmful for people who do not have celiac disease. “Unlike gluten-containing products, gluten-free substitutes are not enriched with iron and could lead to the development of vitamin deficiencies,” says Dr. Benjamin Lebwohl. Read more in the Daily Beast. thebea.st/RZMJYy
Researchers who study gluten and celiac disease caution that if you don’t have the condition, it would be wise to steer clear of this fad, which bans everything from beer to bagels.

“We don’t take the decision to start a gluten-free diet lightly,” says Dr. Benjamin Lebwohl, Herbert Irving Assistant Professor of Epidemiology at Columbia, who focuses on outcomes in celiac disease. “It’s a difficult and expensive and socially isolating diet,” and when it comes to using it as a preventative measure for diseases other than celiac, the science just isn’t there, he says.

Experts further warn that questionable claims are being made by people who stand to benefit lucratively.

One of the most controversial of gluten-free proponents is Dr. Perlmutter, whose Grain Brain which has made the New York Times bestseller list and has been published in 15 countries. The book argues that eating foods with high glycemic indexes, which happen to be some of the most gluten-rich foods, increases the chances of developing neurological disorders like Alzheimer’s and dementia.

The book’s prescription of a gluten-free diet relies in part on recent studies showing that some people without celiac disease have neurological responses to gluten, including migraines, “brain fog” and trouble controlling their muscles, and that high glucose levels, which may be caused by a number of things from diabetes to stress to diet, may be correlated with dementia.

In an interview, Dr. Perlmutter said the point he is making is that “lifestyle choices affect the brain” and emphasized that he does not view a gluten-free diet as a silver bullet. The impact of changes in diet and exercise on brain health has been “left out” of much of the public conversation about disease prevention, says Dr. Perlmutter, so the idea that people could have some control over the trajectory of their brain health is empowering for many. “There is no pill for memory, there is no dementia or Alzheimer’s treatment, but lifestyle choices are hugely impactful in terms of preventing this and even reversing it,” he says.

Grain Brain cites various studies to make its case. One is a case series of 13 patients conducted by the Mayo Clinic in 2006 that showed a potential association between gluten and dementia. However, the researchers noted that the study was small, their results did not display a causal relationship, and that more research was needed to determine the nature of the association. Dr. Perlmutter points to another study released in January from the Journal of Neurology, Neurosurgery and Psychiatry which found that a Mediterranean-style diet that is higher in omega-3 fat and lower in carbohydrates than the typical American

“It’s a difficult and expensive and socially isolating diet,” and when it comes to using it as a preventative measure for diseases other than celiac, the science just isn’t there.
diet dramatically improved cognition.

But many researchers aren’t sure that science has reached the point where connections can so confidently be drawn between diet and cognitive health. Dr. Paul K. Crane, a co-author of one of the cited studies, which was published last August in the *New England Journal of Medicine*, worries that Dr. Perlmutter is one of a growing group of public figures stretching the findings of a study to fit a cure-all narrative.

The problem with Dr. Perlmutter and other gluten-free proponents is that they sometimes extrapolate diet advice from studies that do not directly relate to the research questions the authors set out to answer, says Dr. Crane, who is an associate professor at the University of Washington’s department of medicine studying Alzheimer’s disease and cognitive functioning.

His paper describes a potential link between high blood glucose levels over time and dementia. It did not discuss whether the high blood glucose levels in his subjects were connected to eating gluten-rich foods with high glycemic indices, which tend to cause a short-term jump in blood glucose. This didn’t stop the media and other researchers from reporting that the study was making recommendations for a low glycemic diet, which Dr. Crane himself refuses to make.

“I think a lot of these links are awfully speculative, and a lot more research is needed,” Dr. Crane says.

Last fall, a group of European doctors also championed a low glycemic diet based on a study they published in the journal *Neurology*. The study found that adults with high blood sugar levels had a smaller hippocampus volume and more memory problems than those with lower blood sugar. However, the doctors studied glucose levels, not glycemic index impact, Dr. Crane points out. “Their exposure data was pretty similar to my exposure data, [which was] not at all about glycemic indices in the diet,” Dr. Crane says.

In fact, very little research has been done on the relationship between glycemic indices and neurological problems, and scientists have not determined the impact of multiple swings in blood glucose levels during a single day on dementia risk. While there is better evidence to suggest that exercise is more effective than diet in staying off dementia, Dr. Crane thinks that the media views exercise as boring.

“You can’t sell walking,” he says.

Dr. Armin Alaedini, an assistant professor of medical sciences at Columbia’s department of medicine, who studies the links between bacterial and dietary proteins and the development of immune processes, has also seen his findings stretched to tout the gluten-free diet as a preventative measure.

“There is very little data to suggest that gluten proteins interact directly with the brain,” said Dr. Alaedini, who has studied the impact of gluten proteins in patients with autism and schizophrenia.

But that has not stopped commentators who reviewed his articles from claiming otherwise. “I noticed articles talking so definitively about a role for gluten for which we really didn’t have that kind of evidence,” he said.

However, there is evidence that some patients with and without celiac disease exhibit neurological issues, with one of the most common being “gluten ataxia,” or difficulty moving the limbs after consuming gluten. While this is hard to ignore, researchers aren’t sure that gluten proteins themselves are causing the neurological symptoms, according to Dr. Lebwohl.

For those with a gluten intolerance, such symptoms could potentially be caused by a failure to absorb vitamin B-12, which plays a key role in brain functioning.

“In those who have celiac disease, the management decision is clear: they need to go on a gluten-free diet. In those who don’t have the disease, it’s still very tempting, and I often agree with going on a strict gluten-free diet to see what happens to neurological symptoms,” Dr. Lebwohl says. But “on the other side of things, the more common neurological symptoms a lot of people report...the reason for that is completely unknown at this point.”

For instance, a study by Dr. Lebwohl and others of migraine headaches in people with gluten intolerance found no meaningful correlation between the severity of migraines and the duration of a gluten-free diet.

Ultimately, experts agree that not enough is known about the way gluten impacts the brain—or even whether restricting gluten may negatively impact people without celiac disease—to support a gluten-free diet as a preventative measure for any disease, let alone dementia.

“Even though it makes for a great story, it doesn’t make for great science,” Dr. Alaedini said.
Changing the statins quo

The controversy around the new cholesterol treatment guidelines

the2x2project.org

2x2.ph/1h6xSEq

BY CHRIS TAIT
COMMUNICATION IN EPIDEMIOLOGY & HEALTH FELLOW, MPH '14
Considering that one in three Americans will die of cardiovascular disease, and that 60 percent will have either a heart attack or a stroke at some point in their lives, preventive measures have become increasingly valued among patients and doctors. But how to go about preventing cardiovascular disease has been a controversial issue.

That controversy ramped up in November, with the American College of Cardiology (ACC) and the American Heart Association (AHA)’s new cholesterol guidelines, which were developed to help clinicians determine when they should prescribe a particular cholesterol-lowering medication known as a statin to treat high cholesterol.

At the center of the debate has been one of the major changes in recommendations, a reformulation of how a patient’s risk for cardiovascular disease is calculated. This change, informed by the latest scientific research, is meant to identify people whose overall health will improve from statin use while reducing the number of those who are less likely to benefit, according to the ACC/AHA committee.

But months after the release, the new guidelines remain strongly contested by members of the medical community who worry that the recommendations may result in over-prescription of statins and may be more of a boon for drug companies than patients.

Statins like Lipitor and Crestor are a group of drugs that reduce the amount of cholesterol produced by the liver. They are commonly prescribed for patients at risk of heart attack and stroke as well as a number of other adverse cardiovascular conditions. While the prevalence of heart disease has remained relatively steady throughout the past decade, the use of statin medication to prevent it has escalated dramatically—about ten-fold over the past 20 years.

After the last time the ACC/AHA guidelines were updated, in 2001, there was a three-fold increase in the number of Americans for whom statin therapy was recommended. Critics of the 2013 recommendations worry the number of Americans taking statins will double from 36 million to 72 million patients—one-third of adults over the age of 40. However, studies find that statins reduce cholesterol in many patients who have not had success with a heart healthy diet and exercise, and are credited with saving thousands of lives from premature cardiovascular death, according to a 2013 meta-analysis published in the Journal of the American Medical Association.

Since 2001, the body of evidence surrounding the effectiveness of statin therapy has greatly expanded, largely through randomized clinical trials, which are the gold standard in medical research. According to the ACC/AHA panel, the research suggests that four groups distinguished by age and clinical risk factors would benefit from statin-therapy and that statins safely reduce incidence of cardiovascular disease events, like heart attacks and strokes. Drawing on this research, the ACC and AHA made available an online risk calculator to help physicians estimate their patients’ 10-year risk for cardiovascular disease based on traditional clinical and lifestyle risk factors.

Supporting clinicians say the tool is user-friendly and will help foster important conversations between patients and doctors who are deciding on an appropriate medication regimen.

Opponents, however, challenge the calculator, on the grounds that it greatly overestimates one’s cardiovascular disease risk, potentially resulting in millions being unnecessarily prescribed to statin therapy. Some experts, like Dr. Peter Alagona, Pennsylvania State University’s program director for diagnostic cardiology, express concerns about the impact of the new guidelines on payments for medical treatment. He wonders whether patients who fall outside of the new guidelines but whose doctors recommend they stay on statin therapy would be denied reimbursement from their insurance companies.

And in a New York Times op-ed published immediately after the release of the guidelines, Dr. John Abramson, professor...
Critics worry that the risk calculator will cause physicians to prescribe statins to patients who previously weren’t on the medication.
Encouraging urban health has multiple benefits

Urban+Health symposium

When it comes to urban planning, we tend to look at competing interests: environmentalism versus economic development or affordability versus gentrification. But a building and design approach that prioritizes health can act as an entry point for promoting many other interests at the same time, said speakers at a daylong symposium of the Mailman School of Public Health’s Urban+Health program, co-organized with the Graduate School of Architecture, Planning, and Preservation (GSAPP), which took place April 22 at the GSAPP Studio-X space downtown.

“It’s certainly my impression that health is one of those universal values—across cultures, across countries. How do we then take advantage of that?” asked Dr. Sandro Galea, Gelman Professor of Epidemiology and chair of the department of epidemiology at Columbia’s Mailman School of Public Health, in reference to urban planning.

“When you look at the political context—politicians, communities, societies—often health is a very important value, but it is not the only value. People also care about issues like economic development, the environment, equity issues,” said Karen Lee, MD, senior adviser on the built environment and healthy housing at the New York City Department of Health and Mental Hygiene. “Finding synergies and co-benefits has been a critical part in terms of advancement of these issues in communities.”

She pointed to the multiple benefits of New York City’s “pedestrianization” of Times Square, Herald Square, and Union Square where the city converted automobile lanes to pedestrian plazas with more walking space and seating. In addition to reducing traffic injuries and encouraging more physical activity, the urban makeovers have conferred economic benefits. In Union Square there has been a 49 percent drop in vacant storefronts, and for the first time, Times Square became one of the top ten retail areas in the world. In a similar vein, FRESH (Food Retail Expansion to Support Health) program has incentivized the building of grocery stores in parts of the city that were formerly food deserts, creating both new jobs and proximity to healthy food for residents.

In China, the economic effects of heavy air pollution has fueled concern from a government that historically has been lax on environmental regulation.

“Businesses are paying a premium to send people to China because of air pollution concerns,” said Dr. Carlos Dora, coordinator of the interventions for healthy environments unit, part of the department of public health and environment at the World Health Organization. “We’re going to use air pollution as an entry point” to address issues like chronic disease and climate change, he added. A recent WHO study reported that one in eight people die because of air pollution globally.

By reducing use of cars, dense urban living promotes sustainability more than green suburban living, said Vishaan Chakrabarti, the Marc Holliday Associate Professor of Real Estate Development GSAPP, and a partner at SHoP Architects.

Cities also promote a factor that he calls “public joy.” This can be seen in the many urban centers across the U.S. that are “creating extraordinary pieces of public landscape, public architecture, culture, waterfronts.” People are seeking a walkable urban lifestyle free of long office commutes, which affords them “something that’s critical for health and joy, which is more time,” he said. “Most young people today are looking at that 20th century technology of that suburban house and that office park and trying to find a different way.”

Illustrating Chakrabarti’s point that cities are home to all kinds of creative endeavors, Dr. Natalie Jeremijenko, an associate professor of art at New York
University’s Steinhardt School of Culture, Education, and Human Development, spoke about her work as an artist and scientist who creates sustainable projects for urban environments.

At her Environmental Health Clinic at NYU, she works with clients on projects to address their environmental health concerns. These include a Butterfly Bridge in Washington, which elevates the insects above traffic to protect them from untimely fates on car windshields.

She has also created various air collection devices like “solar chimneys” to collect air pollutants and filter the air. She has tried to work with New York’s Metropolitan Transportation Authority to put a device on one of the system’s air vents but “for security reasons, I’ve been told that I can’t have access to it, which is a great way to say what the MTA is doing provides no filtration whatsoever.”

She also runs an urban farm, which is “the only non-technology we have for improving urban air quality.”

Such projects buttress the idea that the marriage of urban design and health can address a variety of concerns and provide a variety of benefits. As Dr. Gina Lovasi, an assistant professor of epidemiology at Columbia’s Mailman School of Public Health, said: “Cities that support health are going to be supporting our other social and economic goals and the kinds of lives we want to live.”

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It has long been clear that people in a low socioeconomic group are at heightened risk of poor health, compared to those with more resources. What is less clear is why. That relationship is the “black box that needs to be opened” said Dr. Janet-Rich Edwards, the featured speaker at February’s Columbia University Epidemiology Grand Rounds (CUEGR).

The “elephant in the room” in this area of research is child abuse, said Dr. Rich-Edwards, who is an associate professor of medicine and epidemiology at Harvard’s Medical School and School of Public Health.

Dr. Rich-Edwards has found a strong association between low socioeconomic status and women who reported being raped or abused as children. As part of the Nurses’ Health Study, she introduced an investigation into physical, sexual, and emotional abuse during childhood and adolescence and how those experiences predict the likelihood of diseases in adulthood, including diabetes, cardiovascular disease, and hypertension. She found that as the cumulative measure of child abuse increased, the likelihood of these diseases also increased. Those who experienced “severe” physical and sexual abuse during childhood and adolescence were about two times more likely to have food addiction, which is often associated with obesity as an adult.

The good news is that over the last ten years rates of abuse have been on the decline. Dr. Rich-Edwards hopes that awareness of the data will help lower the rates even further and provide opportunities for early interventions to improve women’s health.
MERS comes to the U.S.; camels implicated as the source

According to a new study by Dr. W. Ian Lipkin, John Snow Professor of Epidemiology, director of the Center for Infection and Immunity at Columbia’s Mailman School, and professor of neurology at College of Physicians & Surgeons; Dr. Thomas Briese, associate professor of epidemiology at Columbia; and colleagues, camels are the major source of Middle East Respiratory Syndrome, or MERS, a viral disease that was first detected in Saudi Arabia in 2012 and is responsible for nearly 100 deaths. Dr. Lipkin talked to various media outlets after two cases appeared in the U.S. last month, saying he is confident that “we have MERS under control.”

Watch more on the Wall Street Journal. › on.wsj.com/1n4tKpo
Read more on the LA Times. › lat.ms/1nS625x
Read more in the New York Times. › nyti.ms/1ncpCEp
IN THE NEWS

War on drugs not working

Dr. Ernest Drucker, adjunct professor of epidemiology at Columbia’s Mailman School, is part of a group of academics who have authored a London School of Economics report saying the “singular approach” of the War on Drugs isn’t working. Dr. Drucker points to one of the costliest byproducts of the war: the system of mass incarceration. Read more in the Daily Beast. ›the.bea.st/1nXblft

Anticipating the health effects of a new casino in Baltimore

In response to the city of Baltimore’s plan to welcome a Las Vegas-style casino, Dr. Silvia Martins, associate professor of epidemiology at Columbia’s Mailman School, who has researched the effect of gambling on the health of young people in disadvantaged neighborhoods says that: “Just because you live in a disadvantaged Baltimore neighborhood, you’re not more likely to be impulsive, but there would likely be less prevention strategies in place to control those who are impulsive.” Read more in the Baltimore Sun. ›bsun.md/1ISDaVL

Measles outbreak points to declining vaccine coverage

In the wake of measles outbreaks on both the East and West coasts this past winter, there are fears that a growing trend of vaccine refusal may be driving the infections. “Measles is extremely transmissible, so you really need a very high level of immunization to protect people, so the complacency there is the fact that we don’t see the threat quite the way we did 50 years ago or perhaps even 25 years ago,” Dr. Stephen Morse, professor of epidemiology at Columbia, told PBS in March. Watch the full interview on PBS ›to.pbs.org/1omxcQV and read more in Salon. ›bit.ly/1gm07KT

Worries about an NIH dry spell

The president’s budget for the National Institutes of Health is slowing down the pace of current research and could deter young researchers from entering health fields, says Dr. Neil Schluger, a professor of medicine, epidemiology, and environmental health sciences and chief of the pulmonary, allergy and critical care medicine division at Columbia University. “We really are in the process of losing a generation of people who otherwise might have pursued careers in research.” Read more in Genetic Engineering and Biotechnology News. ›bit.ly/1fmkhbA

How big is the Ebola threat?

The nation of Guinea is currently trying to contain an Ebola epidemic, and it is unclear how far the deadly virus will spread. “It’s not as well contained as we would have hoped. I anticipate we will lose many people, but it will be a self-limited outbreak,” Dr. Ian Lipkin said. Read more in Business Insider. ›read.bi/1iam6Hh and National Geographic. ›bit.ly/1kx4cjg

The reason Ebola is unlikely to lead to widespread epidemics, says Dr. Stephen Morse, is that there are no natural reservoirs for the disease outside of Africa. Read more in Popular Mechanics. ›bit.ly/1e9pzDA
Lifespan more about where you live than your genes

A new Centers for Disease Control and Prevention study reports a large gap in longevity in the U.S. based on the demographics of where people live. “We have been far too tolerant of some of the health gaps that have characterized the U.S. health landscape for many decades,” says Dr. Sandro Galea, Gelman Professor and chair of the department of epidemiology at Columbia’s Mailman School of Public Health. Read more in USA Today. ›usat.ly/1rNkBCN

NYC health commissioner promotes community-based approach

New York City health commissioner Dr. Mary Bassett, who is also an associate professor of clinical epidemiology at Columbia’s Mailman School of Public Health, plans to continue the previous administration’s campaign to improve public health, with an added emphasis on listening to communities. “We have to engage with communities to make sure that they understand that we in government aren’t trying to do things to them but do things with them,” she says. Read and listen to more on WNYC. ›bit.ly/1iambL1

Health effects of Fukushima

Members of the American military who responded to the Fukushima nuclear meltdown last year in Japan are claiming that radiation exposure has put them at risk for future health problems. But Dr. Lydia Zablotska, adjunct assistant professor of epidemiology at Columbia’s Mailman School of Public Health, says exposure levels estimated by the government were “miniscule” and cannot be linked to specific health problems. “It could be genetics, smoking or radiation—and the leukemia would look exactly that same,” she said. Read more in the Huffington Post. ›huff.to/1kpzPeD


